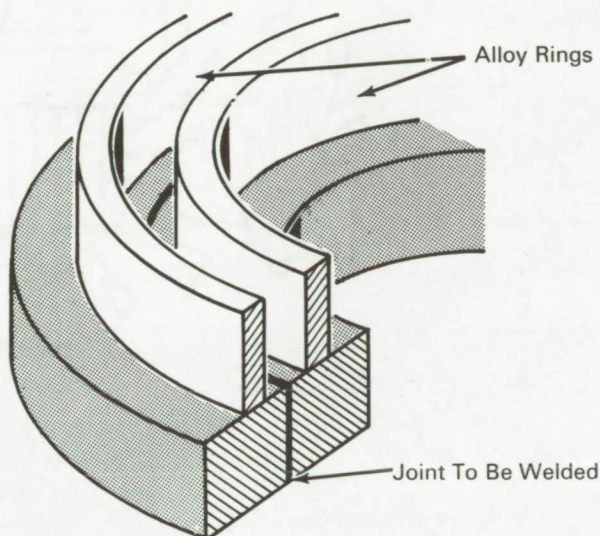


NASA TECH BRIEF



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Electron Beam Welding of Copper-Monel Facilitated by Circular Magnetic Shields



The problem:

Provide a better means of making electron beam welds in a copper-Monel circular joint. Attempts to make these welds resulted in deflection of the electron beam due to magnetic fields present in weld area. Attempts to mechanically compensate for these electron beam deflections were unsuccessful.

The solution:

High permeability, soft magnetic rings placed on both sides of the circular weld seam.

How it's done:

Alloy sheet rings are fabricated out of two or three layers of 0.014-inch-thick highly permeable soft magnetic material such as "Conetic-A" alloy. The resulting rings are about one inch high and 0.028 to

0.042 inch thick. The diameters are such that one ring can be placed inside the circular joint and one ring can be placed outside the joint.

The rings are placed adjacent to the joint to be welded and are not physically bonded in any way to the materials to be welded. The magnetic field seeks the high-permeability shield material, leaving a region of low magnetic force between the rings. The electron beam operates in this region and suffers no degradation due to magnetic deflection.

Notes:

1. This simple shielding technique should find application in electron beam welding operations suffering from interactions between the beam and magnetic fields.

(continued overleaf)

2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama, 35812
Reference: B66-10215

Patent status:

No patent action is contemplated by NASA.

Source: John N. Lamb
of North American Aviation, Inc.
under contract to
Marshall Space Flight Center
(M-FS-569)